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a patent (Rule 4.17(ii)) for the following designations AE,
AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,
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(57) Abstract: Diene-bis-aquo-rhodium(I) complex of the general formula [Rh(diene)(H₂O)₂]X where diene is a cyclic diene and X is a noncoordinating anion.

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A. CLASSIFICATION OF SUBJECT MATTER
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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EPO-Internal, WPI Data, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KOELLE, ULRICH ET AL: "Organometallic aqua complexes. Part 3. Olefin aqua complexes of rhodium(I)" CHEMISCHE BERICHTE, 128(9), 911-17 CODEN: CHBEAM; ISSN: 0009-2940, 1995, XP009044581 cited in the application the whole document	1-6
A		7-13
X	US 6 291 606 B1 (TANG BEN ZHONG ET AL) 18 September 2001 (2001-09-18) column 7, lines 51-55 column 16, lines 45-62 column 17, lines 56-62 claims 1,3,8,10,13,14	1,2,14
A		3-13,15
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☒ Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/36261 A (IMPERIAL CHEMICAL INDUSTRIES PLC; HEMS, WILLIAM, PATRICK; HUTCHINGS, G) 10 May 2002 (2002-05-10) claims	14, 15
X	----- BERGBREITER D E ET AL: "Amphoteric, Water-Soluble Polymer-Bound Hydrogenation Catalysts" TETRAHEDRON LETTERS, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL, vol. 38, no. 21, 26 May 1997 (1997-05-26), pages 3703-3706, XP004064015 ISSN: 0040-4039 cited in the application the whole document	14, 15
P, X	----- BATS, JAN W. ET AL: "Low-temperature phase of diaqua(1,5-cyclooctadiene)rhodium(I) trifluoromethanesulfonate" ACTA CRYSTALLOGRAPHICA, SECTION E: STRUCTURE REPORTS ONLINE, E60(1), M85-M87 CODEN: ACSEBH; ISSN: 1600-5368, 2004, XP002319626 the whole document	1-14
P, X	----- HASHMI, A. STEPHEN K. ET AL: "On the enantioselective rhodium-catalyzed enyne cyclization" ADVANCED SYNTHESIS & CATALYSIS, 345(11), 1237-1241 CODEN: ASCAF7; ISSN: 1615-4150, 2003, XP002319627 the whole document	1-14
P, X	----- MOTODA DAI ET EL: "Phosphane-Free Rhodium Catalyst in an Anionic Micellar System for '4+2' Annulation of Dienynes" ANGEWANDTE CHEMIE INTERNATIONAL EDITION, vol. 43, no. 14, 24 March 2004 (2004-03-24), pages 1860-1862, XP002319460 the whole document	1, 2, 14

INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6291606	B1	18-09-2001	NONE
WO 0236261	A	10-05-2002	AU 1247002 A 15-05-2002
			EP 1390142 A2 25-02-2004
			WO 0236261 A2 10-05-2002
			US 2004220049 A1 04-11-2004